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PRINTING AND FAXING

After reading this chapter and completing the exercises, you will be able to:

♦ Understand Windows XP print terminology and architecture

♦ Understand the special features of the Windows XP print system

♦ Create and manage a printer

♦ Manage printer permissions

♦ Troubleshoot printing

♦ Configure Windows XP fax capabilities

Printing is an integral part of any operating system. Often, people will not understand a concept or layout until they see it on hard copy. In this chapter, you are introduced to some of the concepts associated with Windows XP printing, and then you will learn what is involved in installing and configuring printers for Windows XP. Although this may sound somewhat simplistic, because of the many options that are available when accessing printers in the Windows XP environment, this topic is more complex than it may at first appear. For example, it is important to understand the distinction between printers that are directly attached to a computer and those with built-in network interfaces that are attached directly to a networking medium. You will also learn how to troubleshoot common printing-related problems on Windows XP-based networks and systems. Finally, you will learn how to install and configure Windows XP's fax components.

WINDOWS XP PRINTING TERMINOLOGY

As is the case in other areas of Windows XP system architecture and behavior, Microsoft uses its own unique and specialized terminology to describe and explain how printers interact with the Windows XP system, and how its overall printing capabilities work. For the best results with the Microsoft certification tests, it is important to understand Microsoft's printing subsystem concepts, architecture, and behavior, which is why we begin this chapter with a "vocabulary list" of Microsoft print terminology before we discuss the key components of the Microsoft print architecture and behavior. For convenience, we present these terms in alphabetical order in the following list:

- *Client application*—An application or service that creates print jobs for output, which can be either end-user-originated or created by a print server (*see also* print client).

- *Connecting to a printer*—The negotiation of a connection to a shared printer through the browser service from a client or service across the network to the machine where the shared printer resides.

- *Creating a printer*—Using the Add Printer Wizard in the Printers and Faxes applet (Start|Printers and Faxes) to name and define settings for a print device in a Windows XP-based network.

- *Direct-attached printer*—A print device attached directly to a computer, usually through a parallel port (*see also* network interface printer).

- *Network interface printer*—A print device attached directly to the network medium, usually by means of a built-in network interface integrated within the printer, but sometimes by means of a parallel-attached network printer interface.

- *Print client*—A network client machine that transmits print jobs across the network to a printer for spooling and delivery to a designated print device or printer pool.

- *Print device*—In everyday language, a piece of equipment that provides output service—in other words, a printer; however, in Microsoft terminology, a printer is a logical service that accepts print jobs and delivers them to some print device for output when that device is ready. Therefore, in Microsoft terminology, a print device is any piece of equipment that can produce output, so this term would also describe a plotter, a fax machine, or a slide printer, as well as a text-oriented output device, such as an HP LaserJet.

- *Print job*—The contents of a completely or partially interpreted data file that contains text and control characters that will ultimately be delivered to a print device to be printed or otherwise rendered in some tangible form.

- *Print resolution*—A measurement of the number of dots per inch (dpi) that describes the output capabilities of a print device; most laser printers can produce output at 300 to 600 dpi if not greater. In general, the larger the dpi

rating for a device, the better looking its output will be (but high-resolution devices cost more than low-resolution ones).

- *Print server*—A computer that links print devices to the network and shares those devices with client computers on the network. In the Windows XP environment, both Windows XP Professional and Windows .NET Server can function as print servers.

- *Print Server services*—A collection of named software components on a print server that handles incoming print jobs and forwards them to a print spooler for post-processing and delivery to a print device. These components include support for special job handling that can enable a variety of client computers to send print jobs to a print server for processing.

- *Print spooler*—A collection of Windows XP dynamic link libraries (DLLs) used to acquire, process, catalog, and dispense print jobs to print devices. The print spooler, which manages an area called the spool file on a print server, acts like a holding tank: pending print jobs are stored there until they have been successfully output. The term "despooling" refers to the process of reading and interpreting what is in a spool file for delivery to a print device.

- *Printer (logical printer)*—In Microsoft terminology, a printer is not a physical device, but rather a named system object that communicates between the operating system and a print device. The printer handles the printing process for Windows XP from the time a print command is issued until a print job has been successfully output. The settings established for a printer in the Add Printer Wizard in the Printers and Faxes applet (Start|Printers and Faxes) indicate which print device (or devices, in the case of a printer pool) will handle print output, and also provide controls over how print jobs will be handled (banner page, special post-processing, and so forth). Creating a logical printer is detailed in Hands-on Project 9-1. Deleting a printer is covered in Hands-on Project 9-6.

- *Printer driver*—Special-purpose software components that manage communication between the Windows XP I/O Manager and a specific print device. Ultimately, printer drivers make it possible for Windows XP to despool print jobs and send them to a print device for output services. Modern printer drivers also allow the printer to communicate with Windows XP, and to inform it about print job status, error conditions (out of paper, paper jam, and so forth), and print job problems.

- *Printer pool*—A collection of two or more identically configured print devices to which one or more Windows XP printers direct their print jobs. Basically, a printer pool permits two or more printers to act in concert to handle high-volume printing needs.

- *Queue (print queue)*—A series of files stored in sequential order waiting for delivery from a spool file to a print device.

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- *Rendering*—Windows XP produces output according to the following sequence of steps: (1) A client application or a service sends file information to a software component called the **Graphical Device Interface (GDI)**. (2) The GDI accepts the data, performs any necessary local processing, and sends the data to a designated printer. (3) If this printer is local, the data is directed to the local print driver; if the printer is remote (located elsewhere on the network), the data is shipped to a print server across the network. (4) Either way, the driver then takes the print job and translates it into the mixture of text and control characters needed to produce output on the designated print device. (5) This file is stored in a spooling file until its turn for output comes up, at which point it is shipped to a print device. (6) The target device accepts the input data and turns it into the proper low-level format for rendering on that machine, on a page-by-page basis. (7) As each page image is created, it is sent to the printer's print engine, where it is output on paper (or whatever other medium the print device may use).

- *Spooling*—One of the functions of the print spooler, this is the act of writing the contents of a print job to a file on disk so they will not be lost if the print server is shut down before the job is completed.

Familiarity with these terms is helpful when interpreting questions about Windows XP printing on the certification exam, and in selecting the proper answers to such questions. Testing considerations aside, some familiarity with this lexicon makes it much easier to understand Microsoft Help files and documentation on this subject as well.

WINDOWS XP PRINT SUBSYSTEM ARCHITECTURE

Given all this specialized terminology, it is essential to put it into context within the Windows XP environment, which is why we will describe the architecture of this subsystem next. The Windows XP print subsystem architecture consists of several components that turn print data into a printable file, transfer that file to a printer, and manage the way in which multiple print jobs are handled by a printer. These components are:

- GDI
- Printer driver
- Print spooler

We describe each of these elements in the subsections that follow.

Graphical Device Interface

The Graphical Device Interface (GDI) is the portion of Windows XP that begins the process of producing visual output, whether that output is to the screen or to the printer; it is the part of Windows XP that makes WYSIWYG (what-you-see-is-what-you-get) output possible. In the case of screen output, the GDI calls the video driver; in the case of printed output, it calls a printer driver and provides information about the targeted print device and what type of data must be rendered for output.

Printer Driver

A printer driver is a Windows XP software component that enables an application to communicate with a printer through the IP Manager in the Executive Services module in the Windows XP kernel. A printer driver is composed of three subcomponents that work together as a unit:

- *Printer graphics driver*—Responsible for rendering the GDI commands into **Device Driver Interface (DDI)** commands that can be sent to the printer. Each graphics driver renders a different printer language; for example, Pscript.dll handles PostScript printing requests, Plotter.dll handles the HPGL/2 language used by many plotters, and Rasdd.dll deals with printer languages based on raster images (that is, those based on bitmapped images, which are collections of dots). Rasdd.dll is used by PCL (Printer Control Language) and most dot-matrix printers.

- *Printer interface driver*—You need some means of interacting with the printer, and the role of the printer interface driver is to provide that means; it provides the interface you see when you open the Printers and Faxes applet (Start|Printers and Faxes).

- *Characterization data file*—Provides information to the printer interface driver about the make and model of a specific type of print device, including its features, such as double-sided printing, printing at various resolutions, and accepting certain paper sizes.

Printer drivers are not compatible across hardware platforms, so although several client types (including Windows XP Professional, Windows .NET Server, Windows 2000 Professional and Server, Windows NT 4.0, 3.51, 3.5, and 3.1 Workstation and Server, and Windows 95 and 98) can print to a Windows XP print server without first installing a local printer driver—they'll download the driver from the print server—you must make sure that necessary drivers are available for the proper platforms.

Print Spooler

The print spooler (Spoolsv.exe) is a collection of DLLs and device drivers that receives, processes, schedules, and distributes print jobs. The spooler is implemented as part of the Spooler service, which is required for printing. By default, the Spooler service is installed as part of the base Windows XP installation process (to check its status, look at the Spooler entry in the Services window, or look for Spoolsv.exe in the list on the Processes tab in the Task Manager). The Spooler includes the following components:

- Print router

- Local and remote print providers

- Print processors

- Print monitor

The print spooler can accept data from the print provider in two main **data types**: enhanced metafile (EMF) or RAW. **Enhanced metafile (EMF)** spool files are device-independent files used in Windows XP to reduce the amount of time spent processing a print job—all GDI calls needed to produce the print job are included in the file. **RAW** spool files are device-dependent output files that have been completely processed (usually by their sending application or service) and are ready for output on the targeted print device. After a spool file has been created, control is restored to the application that created the print job, and other processing can resume in the foreground.

> EMF spool files are normally smaller than RAW spool files.

RAW spool files are used for local print jobs, for Encapsulated PostScript (.eps) print jobs, or when specified by the user. Unlike EMF spool files, which still require some rendering once it is determined to which printer they're going, RAW spool files are fully defined when created. The Windows XP print processor also recognizes plain ASCII text files, which may be submitted by other clients (especially UNIX machines); the name of this spool file type is TEXT.

Print Router

The **print router** sends print requests from clients to the print server, so the requests can be routed to the appropriate print provider. When a Windows XP client computer connects to a Windows XP print server, communication takes place in the form of remote procedure calls from the client's print router (Winspool.drv) to the server's print router (Spoolss.dll), at which point the server's print router passes the print request to the appropriate print provider: the local print provider if it's a local job, and either the Windows XP or the NetWare print provider if it is sent over the network.

Print Provider

The **print provider** is server-side software that sends a print job to the proper server in the format required by that server. When a client sends a print job to a remote printer, the print router polls the remote print providers on the client computer and passes control of the print job to the first computer that recognizes the name of the specified printer. Windows XP uses one of the two following print providers:

- *Windows XP print provider (Win32Spl.dll):* Used to transfer print jobs to Windows network print servers
- *NetWare print provider (Nwprovau.dll):* Used to transfer print jobs to NetWare print servers

If the Windows XP print provider recognizes the printer name, it sends the print job along in one of two ways, depending on the operating system on the print server. If the

print server is running a compatible network operating system (such as Windows NT 3.x, Windows for Workgroups, or LAN Manager), the print job is routed by NetBIOS to the print server. If the print server is running Windows XP or Windows NT 4.0, the print provider contacts the Spooler service on the print server, which then passes it to the local print provider.

The local print provider writes the contents of the print job to a spool file (which will have the extension .spl) and tracks administration information for that print job. By default, all spool files are stored in the *%systemroot%*\WINDOWS\System32\Spool\Printers directory, although you can change that location if desired (perhaps if you've installed a faster drive) by adjusting the print server settings in the Printers and Faxes utility from the Start menu or the Control Panel. (You can practice changing the location of the spool file in Hands-on Project 9-4 at the end of the chapter.)

Spool files are normally deleted after the print job to which they apply is completed because they only exist to keep the print job from getting lost in case of a power failure that affects the print server. However, you can configure the spooler to retain all print jobs, even after they are printed. This control is accessed on a per-printer basis on the Advanced tab of the printer's Properties dialog box.

If a NetWare print provider recognizes the printer name, it passes the print job along to the NetWare workstation service, which then passes control of the print job to the NetWare redirector for transfer to the NetWare print server.

> **Note**
> To send print jobs from a Windows XP client to a NetWare server, you must have Client Service for NetWare (CSNW) installed on the client computer (see Chapter 7, "Network Protocols"). To route print jobs through a Windows Server computer to a NetWare print server, the Windows Server must have the Gateway Services for NetWare (GSNW) installed.

Print Processor

A **print processor** works with the printer driver to despool spool files during playback, making any needed changes to the spool file according to its data type. The print processor itself is a PostScript program that understands the format of a document image's file and how to print the file to a specific PostScript printer or class of printers. Windows .NET Server supports two print processors: one for Windows clients and one for Macintosh clients (Sfmpsprt.dll), which is normally installed only after the Services for Macintosh service is installed. Remember that Services for Macintosh is included only with Windows Server products, which is why this isn't an issue on Windows XP Professional machines.

The built-in Windows print processor in Windows XP Professional understands EMF data files, three kinds of RAW data files, and text files. However, the Macintosh print processor that's installed on a Windows Server when Services for Macintosh is installed understands only Pstscrpt1, which signifies that the spool file contains PostScript code from a Macintosh client, but that the output is not destined for delivery to a PostScript

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printer. In actuality, this data type lets the print processor know that a post–processing job must be performed to translate the PostScript into the equivalent RAW data for output on the target printer before the print job can be spooled to the targeted print device.

> Windows XP uses a raster image processor to send print jobs from a Macintosh client to a printer. The limitations of this processor mean that print jobs can have a maximum resolution of 300 dpi and must be printed in monochrome, regardless of the capabilities of the targeted printer. However, there are third-party raster image processors available for those who want to use the full capabilities of their printers even when printing through Services for Macintosh.

Print Monitor

The print monitor is the final link in the chain of the printing process. It is actually two monitors: a language monitor and a port monitor. The **language monitor**, created when you install a printer driver if a language monitor is associated with the driver, comes into play only if the print device is bidirectional, meaning that messages about print job status may be sent both to and from the computer. Bidirectional capabilities are necessary to transmit meaningful error messages from the printer to the client. If the language monitor has a role, it sets up the communication with the printer and then passes control to the port monitor. The language monitor supplied with Windows XP uses the Printer Job Language. The **Printer Job Language** provides printer control at the print-job level and enables users to change printer default levels such as number of copies, color, and printer languages. If a manufacturer creates a printer that speaks a different language, it would need to define another language monitor, because the computer and print device must speak the same language for communication to work.

The **port monitor** transmits the print job either to the print device or to another server. It controls the flow of information to the I/O port to which the print device is connected (a serial, parallel, network, or SCSI port). The port monitor supplied with Windows XP controls parallel and serial ports. If you want to connect a print device to a SCSI port or network port, you must use a port monitor supplied by the vendor. Regardless of type, however, port monitors interface with ports, not printers, and are in fact unaware of the type of print devices to which they are connected. The print job is already configured by the print processor before it ever reaches the output port.

Windows XP supports the following port monitors:

- Local port monitor (Localmon.dll)
- Hewlett–Packard network port monitor (Hpmon.dll)
- Line printer (LPR) port monitor (Lprmon.dll)
- AppleTalk port monitor (Sfmmon.dll)
- DEC network port monitor (Decpsmon.dll)

- Lexmark Mark Vision port monitor (Lexmon.dll)
- NetWare port monitor (Nwmon.dll)
- Standard TCP/IP port monitor (SFM)
- Hypertext Transfer Protocol (HTTP) port monitor
- PJL monitor (Pjlmon.dll)

> **Note**
> By default, only the local print monitor is installed. To use another monitor, you have to create a new port when configuring a printer from the Printers icon.

At this point, you've now been exposed to the unique Microsoft printing terminology and to the architecture of the Windows XP print subsystem. Now, you can learn how to work with printers and to define and configure them.

> **Note**
> In the Windows XP world, the focus is on printers, not print devices. As you've seen, in Windows XP parlance, printers are logical constructs—named combinations of output ports, a print driver, and configuration settings that can involve one or more print devices, the physical output devices—such as laser, ink-jet, or dot-matrix printers, plotters, fax modems, or slide makers. All the configuring and manipulation you do in Windows XP is done to printers, not to the print devices.

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PRINTER DRIVER SOFTWARE

The function of a printer driver is to provide an interface between the client and the printer, whether that printer is connected to a print server or directly to the client. In other words, the job of printing software is to insulate applications from having to incorporate the logic and understanding necessary to communicate with a large collection of printers. That's why the functions that take application-specific file data and translate them into formats suitable for printing are included in the printer drivers themselves.

Because selecting a particular printer for output is part of the Windows printing process, it makes perfect sense to put this intelligence into the driver. That's because you must indicate what kind of device to which you want to send a print job as a part of instructing an application to print to a specific printer. Because print devices differ so much from manufacturer to manufacturer, and even from model to model, the right place to bury the details is in the printer driver itself. Not only does this shield application developers from having to write code to drive every kind of print device imaginable, it also puts the task of building the file translation routines on the print device manufacturers because they're the usual source of driver software.

PRINTING ACROSS THE NETWORK

Few organizations can afford to give each user his or her own printer, which explains why printing to a remote printer across the network is by far the most common print scenario on Microsoft networks. (In fact, many experts argue that sharing printers was one of the original primary justifications for networking.) Two typical options for printing across the network exist for Microsoft network clients, including Windows XP Professional clients:

- You can print to a printer connected to a print server through a parallel or serial port.
- You can print to a printer connected directly to the network.

The main reason to connect a printer directly to the network is for convenience, because the printer doesn't have to be located near the print server. A print server must still provide drivers and print job management.

THE PRINTING PROCESS

Now that you're familiar with the components of the printing process, here is how they fit together when printing from a Windows XP Professional client:

1. The user chooses to print from an application, causing the application to call the GDI. The GDI, in turn, calls the printer driver associated with the target print device. Using the document information from the application and the printer information from the printer driver, the GDI renders the print job.

2. The print job is passed to the spooler. The client side of the spooler makes a remote procedure call to the server side, which then calls the print router component of the server.

3. The print router passes the job to the local print provider, which spools the job to disk.

4. The local print provider polls the print processors, passing the job to the processor that recognizes the selected printer. Based on the data type (EMF or RAW) used in the spool file, any necessary changes are made to the spool file to make it printable on the selected print device.

5. If desired, the separator page processor adds a separator page to the print job.

6. The print job is despooled to the print monitor. If the printer device is bidirectional, the language monitor sets up communication. If not, or after the language monitor is done, the job is passed to the port monitor, which handles the job of getting the print job to the port to which the print device is connected.

7. The print job arrives at the print device and is printed.

INSTALLING AND MANAGING PRINTERS

The Printers and Faxes window is the starting point for all printer installation and management. To reach it, select Start|Printers and Faxes. If there are no printers installed, double-click the Add a printer command in the Quick List to create a printer (add a local printer definition) or connect to one across the network. After you have created or connected to a printer, it appears in this window with its own icon, as the example in Figure 9-1 shows. To set its properties, right-click the printer and choose Properties from the menu that appears.
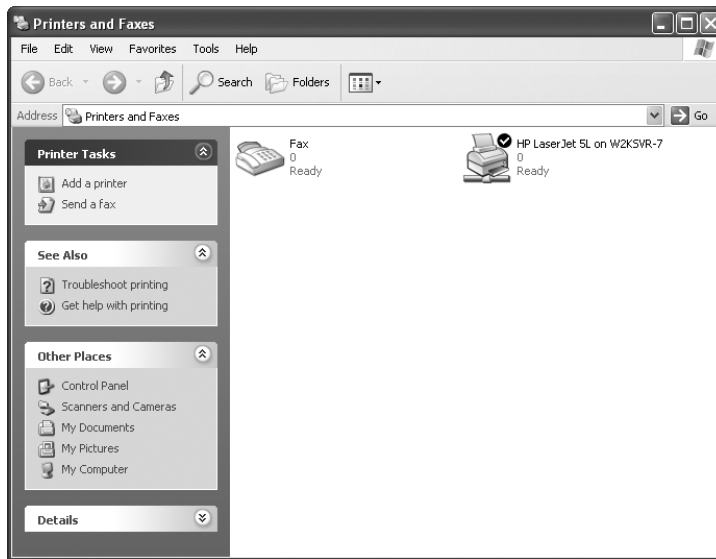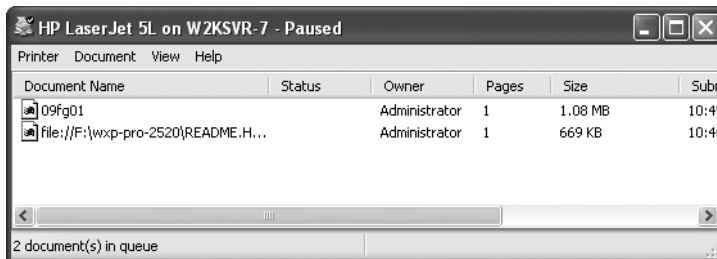

Figure 9-1   The Printers and Faxes window

Managing Print Jobs

The Printers and Faxes window comes into play not only when installing and managing printers, but also when managing print queues (see Hands-on Project 9-3). To manage print jobs, open the Printers and Faxes window and double-click the icon for the printer in question. When you do so, you see a window (similar to the one shown in Figure 9-2) that displays all current print jobs for the selected print device.

To manage a print job, select it and then choose the appropriate menu option. For example, to delete a print job, choose Cancel from the Document menu, and the print job is deleted, allowing the next job in the queue to begin. Alternately, you can right-click the print job's list entry, and select Pause or Cancel. If the job has already been partially or completely spooled to the printer, it continues printing until the print device has finished with the spooled data. But no more data will be sent to the printer after you cancel the job.

Figure 9-2   A printer's queue window

> To delete print jobs, you need Manage Documents or Manage Printers permissions or ownership of the print job. Administrators and Power Users have Print, Manage Printers, and Manage Document permissions over printers by default.

The functions or commands available through the Printer menu of the print queue window are:

- *Connect*—Used to connect to shared printers when the printer share has been dragged and dropped into the Printers and Faxes applet instead of configured using the Add Printer Wizard.

- *Set As Default Printer*—Sets the system to use this printer as the primary printer choice.

- *Printing Preferences*—Opens the Printing Preferences dialog box for this printer. This is the same dialog box reached by clicking the Printing Preferences button on the General tab of the printer's Properties dialog box.

- *Pause Printing*—Halts the printing of all print jobs through this logical printer. When deselected, printing continues from the same point, even mid-print job, where it was paused.

- *Cancel All Documents*—Deletes all print jobs in the queue.

- *Sharing*—Opens the printer's Properties dialog box with the Sharing tab selected.

- *Use Printer Offline*—Turns a local printer queue "off" in much the same way as the offline status of a physical print device.

- *Properties*—Opens the Properties dialog box for the printer.

- *Close*—Closes the printer window.

The options available from the Documents menu are as follows:

- *Pause*—Pauses the print job. If the print job is already in the process of being sent to the printer, no other print jobs can be sent to the printer until it is

resumed or canceled. If the print job is still in the queue, other print jobs will bypass it on their way to be printed.

■ *Resume*—Resumes printing of a paused print job.

■ *Restart*—Prints jobs again from the beginning.

■ *Cancel*—Removes a print job from the print queue.

■ *Properties*—Opens the Properties dialog box for the selected print job.

The Properties dialog box of a print job displays details such as size, pages, data format type, owner, time submitted, layout, and paper tray selection. It also allows you to change the printing priority of the print job and to redefine the schedule. The schedule is the same type of control as a printer's activity time period, meaning that you can set it to either no restriction or define a time within which the print job can be sent to the printer.

Creating a Local Printer

In Windows XP jargon, creating a printer means that you're setting up a printer for local use. To do so, double-click the Add a printer command in the Printers and Faxes window and answer the questions as prompted, including the following:

■ Is the attached printer plug and play compatible?

■ Is the printer local or on the network?

■ To which port will the printer be connected?

■ What is the make and model of the printer?

■ What do you want the printer to be named?

■ Do you want the printer to be the default for all print jobs?

■ Should the printer be shared with the network?

> If you're not sure whether your printer requires some fine-tuning (such as port configuration), you can create the printer and adjust its properties later.

After you have answered all the questions and supplied the needed files for the installation, you can choose to print a test page to make sure you have set up the printer properly. You can practice creating a printer for local use and sharing it with the network in Hands-on Projects 9-1 and 9-2 at the end of this chapter.

Connecting to a Remote Printer

Connecting to a remote printer is even simpler than creating a printer. Once again, double-click the Add a printer link in the Printers and Faxes window, but this time choose to connect to a network printer instead of creating one locally. You are presented with a list of shared printers to which to connect, and have the option of making that printer the default. Select to connect to it, and your work is done. Because Windows XP clients download printer drivers from the print server, you don't have to install drivers locally.

> **Note**
> Windows XP print servers, by default, automatically host and install drivers for Windows XP and Windows 2000. They can also host and install drivers for Windows 95/98/Me, Windows NT 4.0 Intel or Alpha, or Windows XP IA64 if an administrator adds the appropriate drivers.

CONFIGURING A PRINTER

After the printer is created or connected to, configuring it is easy. In the following sections, we explain the options on each tab of the printer Properties dialog box that appears when you right-click a printer in the Printers and Faxes window and choose Properties.

> **Note**
> You can create more than one logical printer for a single print device, so you can set up different configurations for the same print device. Different configurations might include setting up one printer to print high-priority jobs immediately, whereas another might be configured to print low-priority jobs during nonbusiness hours. Just be sure to tell your users to which printer they should connect, so they get the configurations they need.

General Tab

The General tab (see Figure 9-3) in a printer's Properties window contains a variety of controls that you can use to create a text comment that will show up in the Browse list entry for that printer, and to create a separate entry to identify its location. This tab also displays the features and paper sizes currently available for this printer. The Printing Preferences button brings up a window (see Figure 9-4) in which orientation, duplexing, page order, pages per sheet, color, and paper source tray (Paper/Quality tab) are defined. The Print Test Page button sends a default test page to the printer. Note that color printers have an additional tab: Color Management.
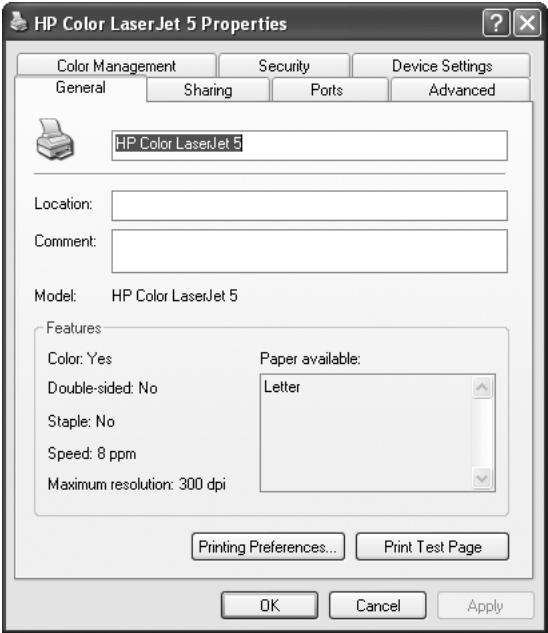
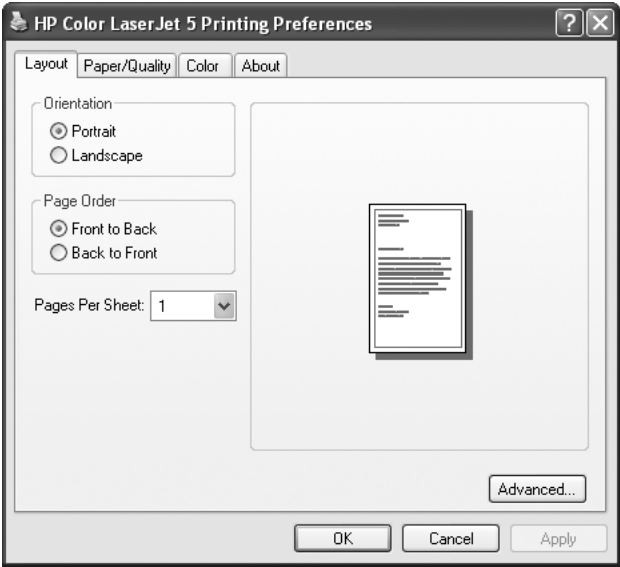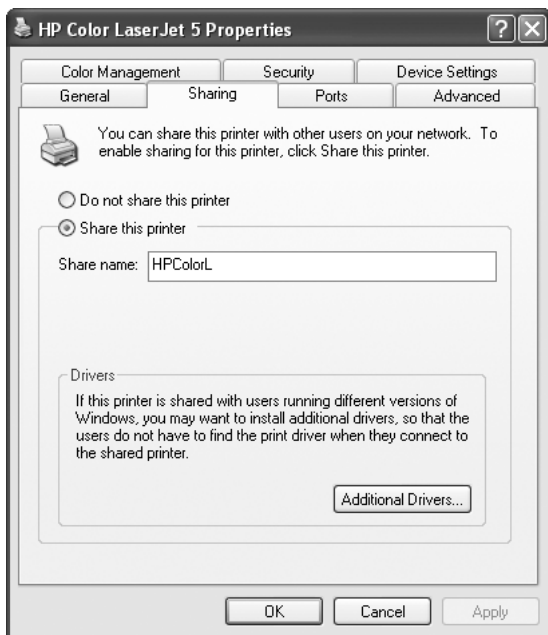**Figure 9-3**   A printer's Properties dialog box, General tab

Figure 9-4   The Printing Preferences dialog box

Sharing Tab

The Sharing tab (shown in Figure 9-5) works much like the Sharing tab used when creating a shared directory. Simply select the Share this printer radio button and provide a Share name for the printer. To install additional drivers for several client types that will be connecting to the printer, click the Additional Drivers button.
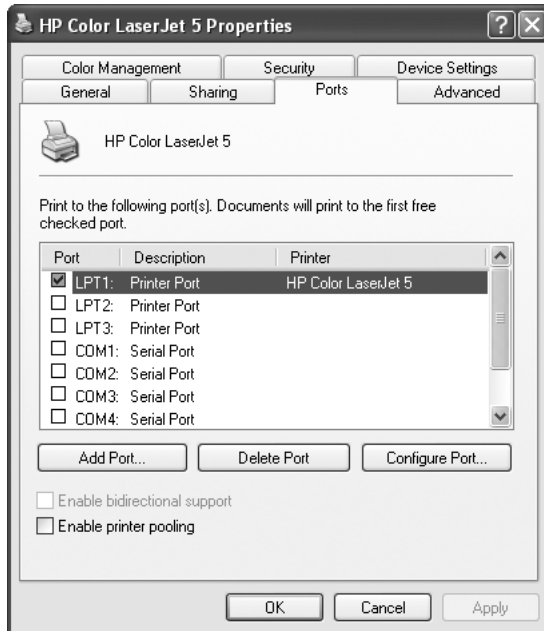

Figure 9-5   A printer's Properties dialog box, Sharing tab

Ports Tab

On the Ports tab (shown in Figure 9-6), you can adjust settings (including interrupts and base I/O addresses) for the ports selected for use with a particular print device. You can also add port monitors by clicking the Add Port button. The bidirectional printing option should be checked for printers that are able to send status information back to the print monitor, where it can provide the basis for user notifications (print job complete, out of paper, paper jam, and so forth).

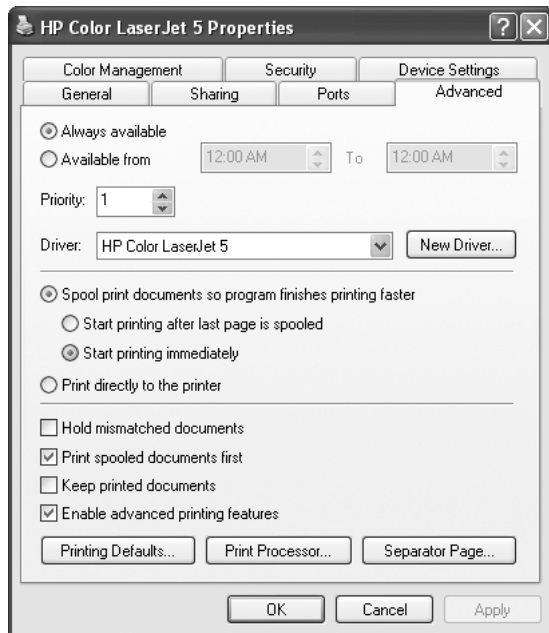**Figure 9-6** A printer's Properties dialog box, Ports tab

This tab is also used to set up a printer pool, in which more than one print device (the physical printer) is assigned to a single printer (the logical printer construct). This option, which works best with identical print devices, even to the amount of memory installed in each, can reduce waiting time on heavily used printers by sending jobs to whichever print device is least busy.

> Select print devices that are in close physical proximity to each other for pooling. Users will not be able to tell to which pooled print device a print job went, and they're not going to like running all over to find their print jobs. Also, if there's any difference in speed among the pooled printers, pool the fastest printer first because the pooling software will check the first-pooled printer first.

Advanced Tab

Use the Advanced tab (shown in Figure 9-7) to set the hours during which the printer is available, set printer priority, and define spooling options. The availability hours are used to enable a printer only within a specified time frame. All print jobs sent to the printer outside this time frame are spooled and printed when the start time is reached. The **printer priority** setting determines which logical printer will be given first access to a printer. This setting is used to grant privileged, faster access to a busy printer for an individual or small group. The higher the number, the higher the priority, ranging from 1 to 99. The default is 1. From this tab, you can also select the printer driver to use or install an updated or alternate driver by clicking the New Driver button.

Figure 9-7   A printer's Properties dialog box, Advanced tab

The spooling options define how print jobs are managed. In most cases, the default options will work well for you, because they'll start the printing process quickly and restore control to the application as rapidly as possible. However, here's what the options mean:

- If you choose to print directly to the printer instead of spooling documents, your application won't regain control until the print job is fully sent to the printer, but it will complete the print job faster.

- Waiting to print until the document has completely spooled to the printer does not hold up the application the way printing to the printer does, but it will delay the printing process commensurately with the size of the print job.

- **Mismatched documents** are those for which the page setup and printer setup are incompatible. Holding mismatched documents prevents only those documents from printing, without affecting any others. This setting is useful because it prevents wasted resources, such as printing one character per page, when such documents are sent.

- If you choose to print spooled documents first, the order in which documents spool to the print device overrides any print priorities that you have in place. By default, this option is disabled, so printer priority controls the order in which jobs print.

- If you want to be able to print a document again without resubmitting it from the application, choose to keep documents in the spooler after they've printed.

- Enabling advanced printing features activates functions, such as page order, booklet printing, and pages per sheet, that are only available on specific printers (and enabled on the Device Settings tab and the Printing Preferences button on the General tab).

At the bottom of the Advanced tab are three buttons: Printing Defaults, Print Processor, and Separator Page. The Printing Default button accesses the same dialog box as the Printing Preferences button on the General tab. The Print Processor button is used to select an alternate printing processor and data type format (RAW, EMF, or TEXT). The selections offered are based on the installed printer drivers and associated printer services. In most cases, you will not change these settings unless specified by a proprietary application or printing procedure.

Separator pages can be handy when several people are using the same printer, and you want to be sure that documents from different users don't get mixed up. Windows XP comes with several separator page files: Pcl.sep, Pscript.sep, Sysprint.sep, and Sysprtj.sep, but you can create custom pages in Notepad. Start off the document by putting a character on a line of its own, then use the codes in Table 9-1 to create separator files with the information that you need.

> You can define any character as the lead character for the codes, but in our example, we use the exclamation point (!).

Save the separator page file with a .sep extension in the *%systemroot%*\WINDOWS\System32 directory, and it will be among the options available when you configure the separator page through the Advanced tab.

Table 9-1   Separator Page Code

Code	Function
!B!M	Prints all characters as double-width block characters until the !U code is encountered
!B!S	Prints all characters as single-width block characters until the !U code is encountered
!D	Prints the date the job was printed, using the format in the Regional and Language Options settings in the Control Panel
!E	Ejects a page from the printer
!F*pathname*	Prints the contents of the file specified in *pathname*, without any formatting
!H*nn*	Prints a printer-specific control sequence, indicated by the hexadecimal number *nn*. Check your printer manual to get the numbers.
!I	Prints the job number (every print job is assigned a number)

Table 9-1   Separator Page Code (continued)

| Code	Function
!L	Prints all the characters following it until reaching another escape code (!)
!N	Prints the username of the person submitting the job
!*n*	Skips a certain number of lines, where *n* is a number between 0 and 9
!T	Prints the time the job was printed, using the format specified in the Regional and Language Options settings in the Control Panel
!U	Turns off block character printing
!W*nn*	Specifies a certain width for the page (counted in characters). The default is 80; the maximum is 256

Color Management Tab

The Color Management tab is used to associate a color profile with a color printer. A color profile is used to control how color is produced by the printer. A color profile takes into account the printer's configuration and the type of media (i.e., paper, film, etc.) being used. This tab is only used by printers supporting color. In most cases, the Automatic selection determines the best color profile to use. However, you can manually install and choose alternate color profiles. Consult your color printer's manual for more information on managing color.

Security Tab

The Security tab (shown in Figure 9-8) contains options quite similar to those used to set up secure files and directories. Here you can set permissions for printers. The Add and Remove buttons are used to alter the list of users and groups with defined permissions for this printer. The Permissions frame lists the permission types (Print, Manage Printers, Manage Documents, and Special Permissions) and offers checkboxes to Allow or Deny individual permissions for the selected user or group.

The three main permissions for printers—Print, Manage Documents, and Manage Printers—encompass the following capabilities:

- *Print documents*—Print, Manage Documents, Manage Printers

- *Pause, resume, restart, and cancel owned document*—Print, Manage Documents, Manage Printers

- *Connect to a printer*—Print, Manage Documents, Manage Printers

- *Control settings for any print job*—Manage Documents, Manage Printers

- *Pause, resume, restart, and cancel all documents*—Manage Documents, Manage Printers

- *Cancel all documents*—Manage Printers
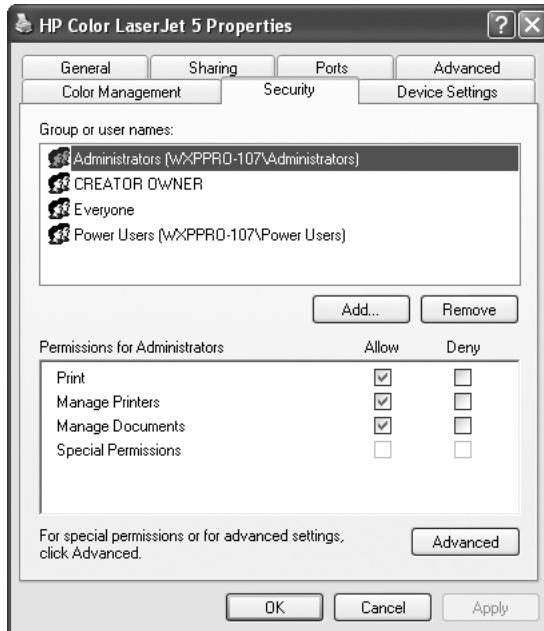
Figure 9-8   A printer's Properties dialog box, Security tab

- *Share a printer*—Manage Printers
- *Delete a printer*—Manage Printers
- *Change permissions*—Manage Printers

The Advanced button reveals another dialog box where more detailed permissions, auditing, and ownership are controlled. On this dialog box (see Figure 9-9), permissions are added on a user or group basis for the detailed permissions of Print, Manage Printers, Manage Documents, Read Permissions, Change Permissions, and Take Ownership. These permission settings can be defined for each user to apply to This printer only, Documents only, or both. The Auditing tab is a control interface similar to the permissions interface where the same types of actions granted through permissions can be set so you can audit them. The audit events created through this object are recorded in the Security log and viewed through the Event Viewer. The Owner tab is used to take ownership for your user account or one of your groups (of which you are a member). Remember that ownership can only be taken, it cannot be given. Try managing printer permissions in Hands-on Project 9-5.
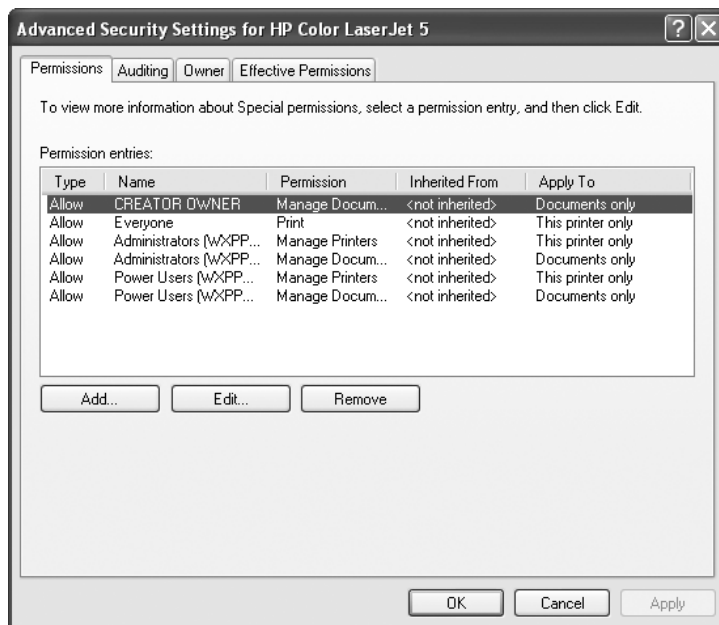
Figure 9-9   The Advanced Security dialog box, Permissions tab

Device Settings Tab

The final tab in the Properties dialog box (shown in Figure 9-10), the Device Settings tab, is used to make sure that the print device itself is configured properly. Most of these settings shouldn't need to be adjusted if you chose the proper printer driver during setup, but these items may be subject to change as you upgrade your printer:

- *Memory*—Be sure that the amount of memory listed on this tab is equal to that installed in the printer. Too little, and you will not get the performance that your printer is capable of. Too much, and the printer may try to take on more than it can handle.

- *Paper trays and other accessories*—Some printers may be upgraded with particular paper trays. If you install one, or rearrange existing ones, you'll need to update the settings here.

There may be other options and functions listed on this tab that are printer model-specific. When these appear, consult the printer's user manual for information on modifying those settings.
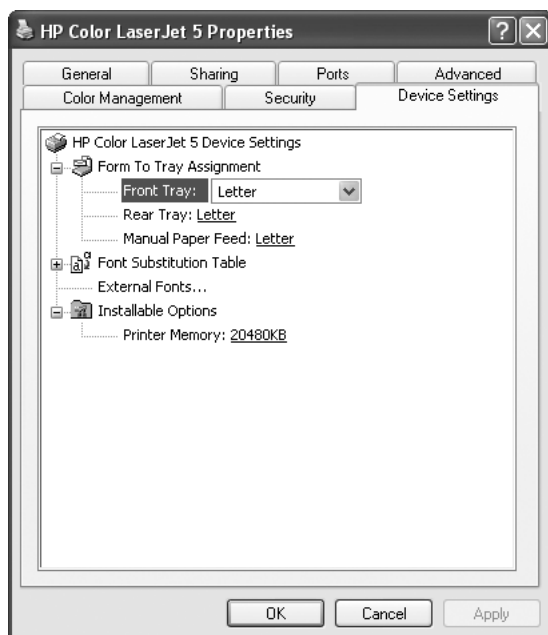
Figure 9-10   A printer's Properties dialog box, Device Settings tab

PRINTERS AND THE WEB

Windows XP includes Web support in its print subsystem, which allows remote users to submit print jobs for printing, view printer queues, and download print drivers. See Hands-on Project 9-8 to configure Windows XP Professional to connect to an Internet printer. These features are afforded through the **Internet Printing Protocol (IPP)**. The Web-based features are accessible only when the print server is running Internet Information Services (IIS).

IPP offers two main benefits. First, it enables Web-based distribution of printer drivers. Second, it offers Web-based print queue management.

To download a printer driver, simply use a URL as the network path when connecting to a network printer. The URL should be formatted as: http://<printservername>/printers/<printersharename>/.printer.

To access a print queue through the Web, open a URL with the following formatting: http://<*printservername*>/printers/. Select a printer from the list, then use the Web-based menu to perform print queue management. The operations and commands are the same as those accessed through a normal printer queue window.

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MANAGING THE PRINT SERVER

In addition to the configurable properties of each logical printer, the print server itself can be fine-tuned. Selecting Server Properties from the File menu from the Printers and Faxes window reveals the Print Server Properties dialog box (see Figure 9-11).
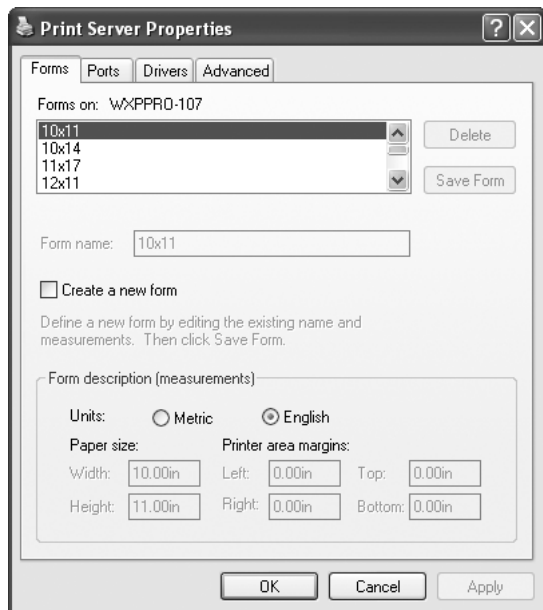
Figure 9-11   The Print Server Properties dialog box, Forms tab

The Forms tab of this dialog box is used to define paper sizes. The Ports tab lists all known ports and installed printers on those ports (if any). On this tab, you can add new ports, delete existing ports, or configure individual ports. The Drivers tab lists the installed printer drivers. On this tab, you can add, remove, replace, or configure printer drivers. The Advanced tab offers control over the spool file location and several events:

- Log spooler error events
- Log spooler warning events
- Log spooler information events
- Beep on errors of remote documents
- Show informational notifications for local printers
- Show informational notifications for network printers
- Notify when remote documents are printed
- Notify computer, not user, when remote documents are printed

All of these events, when selected, appear in the System log, viewed through the Event Viewer. The default location for the spool files is *%systemroot%*\WINDOWS\System32\ Spool\Printers.

TROUBLESHOOTING PRINTING PROBLEMS

Printing from Windows XP is usually a trouble-free process, but there's always something that can go wrong. Microsoft recommends following these steps when troubleshooting printing problems:

1. Identify which of the seven components of the printing process is failing (printer creation and configuration, connecting to a shared printer, creating a print job, sending the print job to the spooler, processing the spooled job, sending the processed job to the print device, or printing at the device). To find the correct one:

    a. Analyze the symptoms of the problem.

    b. Change the configuration as applied to that part of the process.

    c. Test the configuration to see if the print job works.

    d. If the print job now works, you found the right part. If not, then it's time to start over.

2. After you identify the problem, look for documented solutions online, in the manuals that ship with Windows XP or the printer, or in the Microsoft Knowledge Base (*http://support.microsoft.com/search/*).

3. Implement a short-term solution.

4. Implement a long-term solution, if possible.

Troubleshooting Printing in General

When deciding upon your method of attack for a systematic troubleshooting response to a printing problem, try the following:

- Check the physical aspects of the printer—cable, power, paper, toner, etc.
- Re-create the logical printer on the client.
- Terminate and reshare the printer on the print server.
- Try using a different application, user account, or computer to print to the same printer.
- Check for stalled print jobs.
- Make sure the printer is online (a device setting).
- Reinstall the print driver.

- Start and restart the spooler (discussed later in this chapter).

- Check the free space on the drive where the spooler is directed; at least 75 MB is recommended.

- Try using the Print Troubleshooter by selecting Start, Help and Support, clicking on Fixing a problem, then clicking on Printing problems.
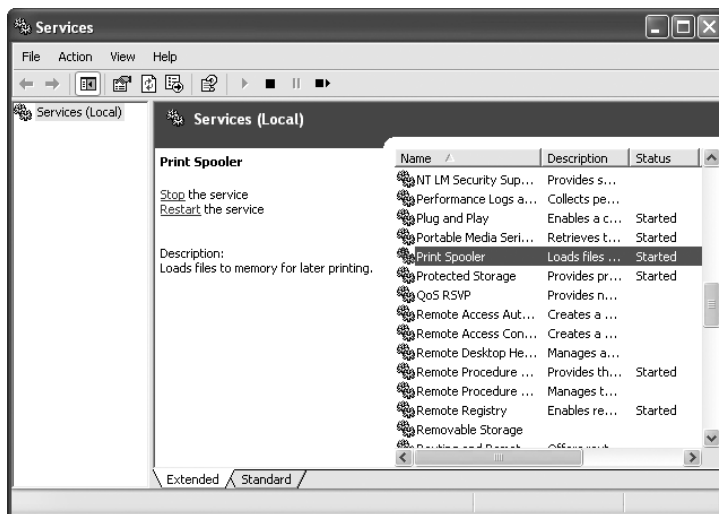
Troubleshooting Network Printing

When troubleshooting network printing problems, add the following steps to your troubleshooting checklist:

1. Verify basic network connectivity, making sure you can see and connect to the print server from your workstation. Try copying a file to or from the server. If you can't do this, the print server itself may be inaccessible.

2. Create a local printer and redirect its port to a network printer. This will determine whether there's a problem copying files from the server to the workstation, as is done when you connect to a shared printer.

3. Print from a DOS-based program using the NET USE command to connect to the printer. If the print job works, this may indicate that the connection to the printer is not persistent and needs to be adjusted.

4. If using TCP/IP printing or connecting to a printer attached directly to the network, try PINGing the printer's IP address (by opening a Command Prompt window and typing PING followed by the printer's IP address) to make sure it's functioning. Also, create an LPR port to the printer and connect to that port to allow the computer to act as the printer's queue.

Stopping and Restarting the Print Spooler

The Spooler service is required for printing. Like other services, it's stopped and started—and its startup configured—from the Services tool in Administrative Tools (from the Control Panel). By default, the Spooler service is set to begin automatically when the system starts. To stop it, select it from the list of services (it's called Print Spooler—see Figure 9-12) and click the Stop button or select Stop from the Action menu. To start it again, select it from the list (it will remain on the list even when stopped) and click Start. Sometimes, stopping and restarting the spooler service can clear up problems that are difficult to troubleshoot.

Figure 9-12   Selecting the Print Spooler service from the Services applet

> For more information on troubleshooting the printing process, see Chapter 15, "Troubleshooting Windows XP."

FAX SUPPORT

Windows XP Professional supports native fax features and operations. The Printers and Faxes applet in the Control Panel is used to install and configure the fax components of Windows XP as well as printers. Faxing is not enabled by default. To initiate faxing, click on "Install a local fax printer" from the Printer Tasks list. You must have a fax-capable device installed in order to configure faxing. This action installs the required components for faxing. A Fax icon will appear in the Printers and Faxes window.

Opening the Properties dialog box for the Fax icon reveals a multi-tabbed dialog box very similar to that of a printer. In fact, the General and Security tabs are exactly alike.

The Sharing tab will be blank when the fax device is a fax modem. Fax modems cannot be shared under Windows XP. The Sharing tab will function normally for fax devices that are not fax modems but multi-function print/fax devices.

The Fax Security tab is very similar to the Security tab. However, the permissions it controls are Fax, Manage Fax Configuration, Manage Fax documents, and Special Permissions. The permissions on this tab control the special capabilities of faxing, whereas the permissions on the Security tab control the printer-like queue of the fax device.

The Devices tab is used to view the fax device(s) and access the fax-related settings of the device. Those settings include: enable send, Transmitting Subscriber Identification (TSID), banner, retries, retry time delay, discount toll periods, enable receive, Called Subscriber Identification (CSID), answer mode, answer ring number, automatic print, automatic save to file, and delete old faxes after a time period.

The Tracking tab (see Figure 9-13) is used to define the notification and monitoring settings of the fax device. These include notification of the progress of a sent or received fax, as well as the success or failure of incoming and outgoing faxes. You can also configure the Fax Monitor to open whenever a fax is sent or received and whether a sound is played for fax events.

Figure 9-13   The Tracking tab of the Fax Properties dialog box

The Archives tab defines the storage location for incoming and outgoing faxes. You may also select not to store faxes.

The first time you double-click the Fax icon from the Printers and Faxes window, you may be prompted for your area code and the Fax Configuration Wizard appears. This Wizard is used to define sender information details (see Figure 9-14) and set the fax device. After this Wizard has been executed once, it won't appear again. Instead, subsequent double-clicks to the Fax icon will open the Fax Console. This console is used to manage incoming and outgoing faxes in much the same way as a standard printer queue. Through this tool you can also create custom cover pages and alter your sender information.

Figure 9-14   The Sender Information page of the Fax Configuration Wizard

To send a fax from Windows XP, you can either print a document from any application and select Fax as the printer. Or, you can issue the Send a fax command from the Quick List of the Printers and Faxes window. In either case, the Send Fax Wizard will walk you through the process of sending a fax.

Troubleshooting fax problems is accomplished through a few simple actions. First, check the physical connections of the phone line from the wall to the computer's fax device. Second, verify the driver is properly installed through the Device Manager. Third, check to make sure you have enabled send and/or receive capabilities for that modem. Fourth, check the Receive options to ensure you are handling inbound faxes as you actually intend.

CHAPTER SUMMARY

- ❐ The Windows XP print subsystem architecture consists of several components that turn print data into a printable file, transfer that file to a printer, and manage the way in which multiple print jobs are handled by a printer. These components are the GDI, printer driver, and print spooler.

- ❐ Microsoft uses a special vocabulary for printing-related services, software and hardware components, and activities. It is important to grasp this vocabulary to be able to interact with and troubleshoot the Windows XP print subsystem.

- ❐ You use the Add Printer Wizard in the Printers and Faxes applet to create, share, and connect to print devices, whether directly attached to a local machine or shared elsewhere on the network.

❐ You also use the Add Printer Wizard to configure a print device, including the selection of the driver, output configuration, and post-processing options, and working with two or more identically configured printers to establish a printer pool.

❐ It is important to fine-tune the printing process for various situations, including managing priorities for print jobs, and setting up multiple printers with differing priorities so that multiple-user communities can share a single print device, yet give one community preferential access to the device.

❐ The most common causes of printing problems in the Windows XP environment were discussed, along with suggestions for how to isolate and identify their causes, and take the right kinds of corrective actions to resolve them.

❐ Faxing has been thoroughly integrated with Windows XP's printing system. Faxing is natively supported and requires only a few easy configuration steps to enable faxing from any print-capable application.

KEY TERMS

characterization data file — The file responsible for rendering the GDI commands into DDI commands that can be sent to the printer. Each graphics driver renders a different printer language.

client application — An application or service that creates print jobs for output, which can be either end-user-originated or created by a print server itself (*see also* print client).

connecting to a printer — The negotiation of a connection to a shared printer through the browser service from a client or service across the network to the machine where the shared printer resides.

creating a printer — Setting up a printer for local use.

data type — The format in which print jobs are sent to the spooler. Some data types are ready for printing (RAW) and some require further preparation (EMF).

Device Driver Interface (DDI) — A specific code component that handles the translation of generic print commands into device-specific equivalents, immediately prior to delivery of a spool file to a print device.

direct-attached printer — A print device attached directly to a computer, usually through a parallel port (*see also* network interface printer).

enhanced metafile (EMF) — Device-independent spool data used to reduce the amount of time spent processing a print job. Once it's queued, EMF data requires additional processing to prepare it for the printer.

Graphical Device Interface (GDI) — The portion of the Windows XP operating system responsible for the first step of preparing all graphical output, whether to be sent to a monitor or to the printer.

Internet Printing Protocol (IPP) — A new Windows XP protocol that adds Web support to the print subsystem. IPP allows remote users to submit print jobs for printing, view printer queues, and download print drivers.

language monitor — The part of the print monitor that sets up bidirectional messaging between the printer and the computer initiating the print job.

mismatched document — A document with incompatible printer and page settings (that is, the page settings are impossible to produce given the existing printer settings).

network interface printer — A print device attached directly to the network medium, usually by means of a built-in network interface integrated within the printer, but sometimes by means of a parallel-attached network printer interface.

port monitor — The part of the print monitor that transmits the print job to the print device through the specified port. Port monitors are actually unaware of print devices as such, but only know that something is on the other end of the port.

print client — A network client machine that transmits print jobs across the network to a printer for spooling and delivery to a designated print device or printer pool.

print device — In everyday language, a piece of equipment that provides output service—in other words, a printer. However, in Microsoft terminology, a printer is a logical service that accepts print jobs and delivers them to some print device for output when that device is ready. Therefore, in Microsoft terminology, a print device is any piece of equipment that can produce output, so this term would also describe a plotter, a fax machine, or a slide printer, as well as a text-oriented output device, such as an HP LaserJet.

print job — The contents of a completely or partially interpreted data file that contains text and control characters that will ultimately be delivered to a print device to be printed, or otherwise rendered in some tangible form.

print processor — Software that works with the printer driver to despool files and make any necessary changes to the data to format it for use with a particular printer. The print processor itself is a PostScript program that understands the format of a document image file and how to print the file to a specific PostScript printer or class of printers.

print provider — The server-side software that sends the print job to the proper server in the format that it requires. Windows XP supports both Windows network print providers and NetWare print providers.

print resolution — A measurement of the number of dots per inch (dpi) that describes the output capabilities of a print device; most laser printers usually produce output at 300 or 600 dpi. In general, the larger the dpi rating for a device, the better looking its output will be (but high-resolution devices cost more than low-resolution ones).

print router — The software component in the Windows XP print subsystem that directs print jobs from one print server to another, or from a client to a remote printer.

print server — A computer that links print devices to the network and shares those devices with client computers on the network.

Print Server services — A collection of named software components on a print server that handles incoming print jobs and forwards them to a print spooler for post-processing and delivery to a print device. These components include support for special job handling that can enable a variety of client computers to send print jobs to a print server for processing.

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print spooler — A collection of Windows XP DLLs used to acquire, process, catalog, and dispense print jobs to print devices. The spooler acts like a holding tank, in that it manages an area on disk called the spool file on a print server, where pending print jobs are stored until they've been successfully output. The term "despooling" refers to the process of reading and interpreting what's in a spool file for delivery to a print device.

printer (logical printer) — In Microsoft terminology, a printer is not a physical device, but rather a named system object that communicates between the operating system and some print device. The printer handles the printing process for Windows XP from the time a print command is issued, until a print job has been successfully output. The settings established for a printer in the Add Printer Wizard in the Printers and Faxes applet (Start|Printers and Faxes) indicate which print device (or devices, in the case of a printer pool) will handle print output, and also provide controls over how print jobs will be handled (banner page, special post-processing, and so forth).

printer driver — Special-purpose software components that manage communications between the I/O Manager and a specific print device. Ultimately, printer drivers make it possible for Windows XP to despool print jobs, and send them to a print device for output services. Modern printer drivers also allow the printer to communicate with Windows XP, and to inform it about print job status, error conditions (out of paper, paper jam, and so forth), and print job problems.

printer graphics driver — The part of the printer driver that renders GDI commands into device driver interface commands that may be sent to the printer.

printer interface driver — The part of the printer driver that provides an interface to the printer settings.

Printer Job Language — A specialized language that provides printer control at the print-job level and enables users to change printer default levels such as number of copies, color, printer languages, and so on.

printer pool — A collection of two or more identically configured print devices to which one or more Windows XP printers direct their print jobs. Basically, a printer pool permits two or more printers to act in concert to handle high-volume printing needs.

printer priority — The setting that helps to determine which printer in a pool will get a given print job. The printer with the higher priority is more likely to get the print job.

queue (print queue) — A series of files stored in sequential order waiting for delivery from a spool file to a print device.

RAW — Device-dependent spool data that is fully ready to be printed when rendered.

rendering — Graphically creating a print job.

spooling — One of the functions of the print spooler, this is the act of writing the contents of a print job to a file on disk so they will not be lost if the print server is shut down before the job is completed.

REVIEW QUESTIONS

1. In the Windows XP print model, the hardware used to produce printed output is called a _____ .

2. What is a print device connected to a computer through a parallel cable known as?

    a. logical printer

    b. network-attached printer

    c. print processor

    d. direct-attached printer

3. Which of the following is software that enables the operating system to communicate with a printer?

    a. printer driver

    b. print provider

    c. print monitor

    d. print router

4. The _____ service implements the part of the printing software that receives, processes, schedules, and distributes print jobs.

5. Because they're device-independent, EMF spool files are generally smaller than RAW spool files. True or False?

6. Which of the following statements are true about network-attached printers? (Choose all that apply.)

    a. They can be a member of a printer pool.

    b. They can use TCP/IP to receive print jobs.

    c. They can only be serviced by a single logical printer.

    d. They require a print server to operate.

7. Spool files are normally deleted after the print job they prepared is completed. True or False?

8. Which software must you have installed to access a NetWare print server through a Windows Server machine?

    a. Client Services for NetWare

    b. File and Print Services for NetWare

    c. Internet Printing Protocol

    d. Gateway Services for NetWare

9. Which tool or mechanism is used to grant one user or group faster printing than others?

   a. print resolution

   b. print priority

   c. printer availability

   d. printer pools

10. To delete a print job, you must have Manage Documents permissions. True or False?

11. Auditing can be defined on a permission and user detail level. True or False?

12. What is the function of the .sep files stored in the \System32 directory?

   a. to create custom graphics banner pages for print jobs

   b. to provide templates for separator pages

   c. to provide standard separator pages for immediate use

   d. none of the above

13. When you've got more than one printer set up for the same print device, what is this known as?

   a. print sharing

   b. printer pooling

   c. printer porting

   d. none of the above

14. Ownership of a printer can be assigned to any group. True or False?

15. If you choose to print directly to ports, what will happen?

   a. The job will be able to print only if it can fit all at once into printer memory.

   b. The application will stall until the print job is completed.

   c. The application will stall until the print job is fully spooled to the printer.

   d. Complex pages may not print correctly.

16. Clients connecting to a network over RAS links do not have the ability to print. True or False?

17. What must all logical printers for a single print device have in common?

   a. priority

   b. access time window

   c. driver

   d. paper tray source

   e. none of the above

18. The one restriction on the members of a printer pool is that all print devices must be the exact same model. True or False?

19. When pages will print only after being fully loaded into printer memory, page protection is _____ .

20. The spool files are stored in which location by default?

  a. \Documents and Settings\Printers\Spooler

  b. *%systemroot%*\WINDOWS\System32\Spooler\Printers

  c. *%systemroot%*\WINDOWS\System32\Printers\Spooler

  d. \Temp\Spooler

21. Print queues cannot be managed from a Web browser. True or False?

22. After sending several print jobs to a printer, you discover that they have not printed. You look at the print queue and the only items there are your print jobs. You attempt to delete them but are unable to. What can you do to resolve this?

  a. Make sure the printer is not paused.

  b. Cycle the power on the printer.

  c. Restart the print spooler.

  d. Create a new shared printer on the print server.

23. Which printer permission level has the ability to print documents, connect to a printer, and share a printer?

  a. Print

  b. Manage Documents

  c. Manage Printers

24. What is the first step in troubleshooting network printer problems?

  a. Re-create the local logical printer.

  b. Print from a DOS application.

  c. Change client computers.

  d. Verify that you can see and connect to the print server.

25. Windows XP printer settings include both the native internal default controls of the Windows XP print system and device-specific proprietary controls of the physical device. True or False?

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HANDS-ON PROJECTS

Project 9-1

To create a local printer:

This hands-on project does not require a physical printer.

1. Open the Printers and Faxes applet (click **Start**|**Printers and Faxes**).
2. Click **Add a printer** in the Printer Tasks column.
3. Click **Next** in the Add Printer Wizard dialog box.
4. Select **Local printer attached to this computer**.
5. Deselect the checkbox about automatically detect and install plug and play printers if it is selected.
6. Click **Next**.
7. In the Use the following port pull-down list, select **LPT1**.
8. Click **Next**.
9. From the list of manufacturers, locate and select **HP**.
10. From the list of printers, locate and select **HP LaserJet 5**.
11. Click **Next**.
12. If the required printer driver is already present on the system, you may see a page asking whether to keep the existing driver or to replace the existing driver. Select to replace, then click **Next**.
13. Provide a name for this printer and select **Yes** for this printer to be the default.
14. Click **Next**.
15. Select **Do not share this printer** if it is not already selected.
16. Click **Next**.
17. Select **No** to printing a test page if it is not already selected.
18. Click **Next**.
19. Click **Finish**.
20. The newly added printer is displayed in the Printers and Faxes window (you may need to refresh the display by pressing F5).

Project 9-2

To share a printer with the network:

This hands-on project requires that you complete Hands-on Project 9-1.

1. Right-click the printer created in Hands-on Project 9-1, and select **Sharing** from the resulting menu. The printer's Properties dialog box appears with the Sharing tab selected.
2. Click the **Share this printer** radio button.
3. Provide a name for the share.
4. Click **OK**.

Project 9-3

To pause a print queue, see documents, delete documents, and restart a print queue:

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This hands-on project requires that you complete Hands-on Project 9-1.

1. From the **Printers and Faxes** applet, double-click your default printer (the one with the circled check mark).
2. From the Printer menu, select **Pause Printing**.
3. Open any application, such as Notepad. Print three documents.
4. Return to the open print queue.
5. Double-click any of the print jobs now appearing in the queue.
6. Explore the information for this document.
7. Click **OK**.
8. Highlight any of the documents in the queue.
9. From the Document menu, select **Pause**.
10. Select a different document in the queue.
11. From the Document menu, select **Cancel**.
12. Select the paused document in the queue.
13. From the Document menu, select **Resume**.
14. From the Printer menu, select **Cancel All Documents**.

15. Click **Yes** to confirm the deletion of print jobs if prompted.

16. From the Printer menu, select **Pause Printing**.

17. From the Printer menu, select **Close**.

Project 9-4

To change the location of the spool files:

1. From the File menu, select **Server Properties**.

2. Select the **Advanced** tab of the **Print Server Properties** dialog box.

3. Change the Spool folder field to **c:\temp\spooler** (or something similar that matches an existing folder on your computer).

4. Click **OK**, then click **Yes** to confirm the changes to the spool folder.

Project 9-5

To change printer permissions:

This hands-on project requires that you complete Hands-on Project 9-1.

1. Right-click the printer created in Hands–on Project 9-1, and select **Properties** from the resulting menu.

2. Select the **Security** tab from the printer's Properties dialog box.

3. Select the **Power Users** group.

4. Deselect the **Allow** check box for Manage Printers.

5. Click **OK**.

Project 9-6

To delete a printer:

This hands-on project requires that you complete Hands-on Project 9-1.

1. Select the printer created in Hands–on Project 9-1.

2. From the **File** menu, select **Delete**.

3. Click **Yes** to confirm the deletion.

4. Click **OK** on the warning that the printer has been removed.

5. In the Printers and Faxes applet, select **File|Close**.

Project 9-7

To enable fax receiving:

> This hands-on project requires that a fax modem be already present and installed on the system.

1. Open the Printers and Faxes applet (**Start|Printers and Faxes**).
2. Click **Install a local fax printer** from the Printer Tasks column. Windows XP installs the necessary foundation components for fax services.
3. A Fax icon appears In the Printers and Faxes window, double-click it.
4. If prompted, provide your area code, then click **OK**.
5. The Fax Configuration Wizard appears. Click **Next**.
6. Fill in all the request sender information, then click **Next**.
7. Use the pull-down list to select your fax device. Mark both the **Enable Send** and **Enable Receive** checkboxes.
8. Set the Rings before answer to **1**.
9. Click **Next**.
10. Provide a TSID, such as **Lab Fax 2**, then click **Next**.
11. Provide a CSID, such as **Lab Fax 2**, then click **Next**.
12. Make no changes on the Routing Options page. Click **Next**.
13. Click **Finish**. Your Windows XP system is now configured to answer incoming fax calls.

Project 9-8

To connect to an Internet printer:

> This hands-on project requires that a Windows XP system running IIS is present and a shared printer is installed on the IIS host.

1. Open the Printers and Faxes applet (**Start|Printers and Faxes**).
2. Click **Add a printer** in the Printer Tasks colums.
3. Click **Next**.
4. Select **Network Printer**, then click **Next**.
5. Select the **Connect to a printer on the Internet or on your intranet** radio button.

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6. Type the **URL** to your printer in the form of http://<*servername*>/printers/ <*servername*>/.printer where <*servername*> is the name of the IIS/PWS host/printer server and <*sharedname*> is the name of the printer share.

7. Click **Next**.

8. If prompted for authentication, provide a name and password with access permissions to this printer.

9. Select whether to configure this printer as the default printer for your client. Click **Next**.

10. Click **Finish**.

CASE PROJECTS

1. Your workgroup has a single physical printer. One person in the workgroup generates many memos and other short documents, while another produces very long documents that are (usually) less time-sensitive than the memos. You can't add another printer to the network, and both users must be able to print throughout the workday. How can you make sure that the memos are printed in a timely fashion?

2. Documents sent to your locally attached printer no longer print. Explain the basic troubleshooting steps you would take to resolve the problem.